

A Cellular View of Inheritance

Meiosis: The Mechanism behind Inheritance Date _____

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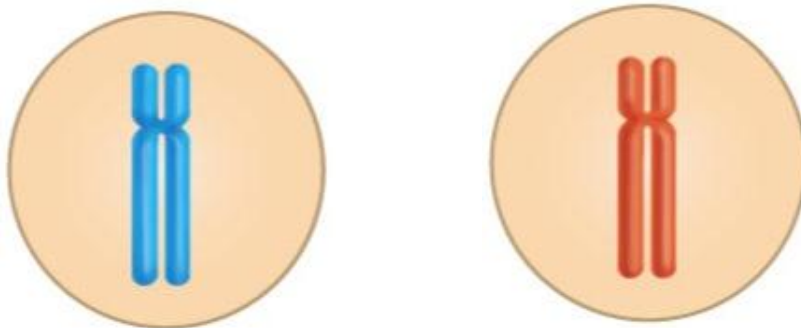
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Chromosomes occur in matching pairs (one from egg cell, one from sperm cell)

Diploid

two sets of chromosomes ($2n$)

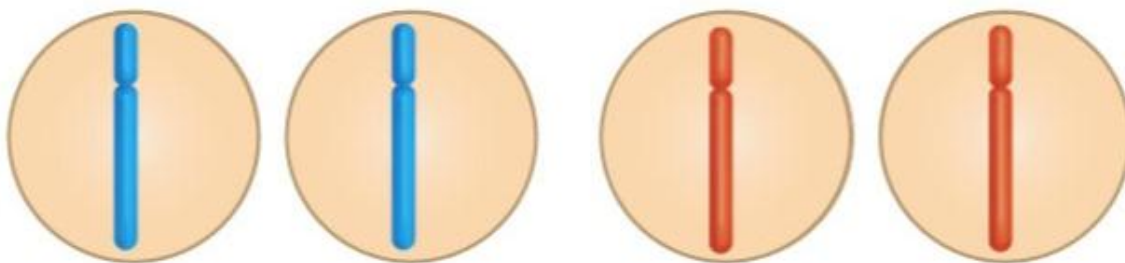
→ body (somatic) cells



Haploid

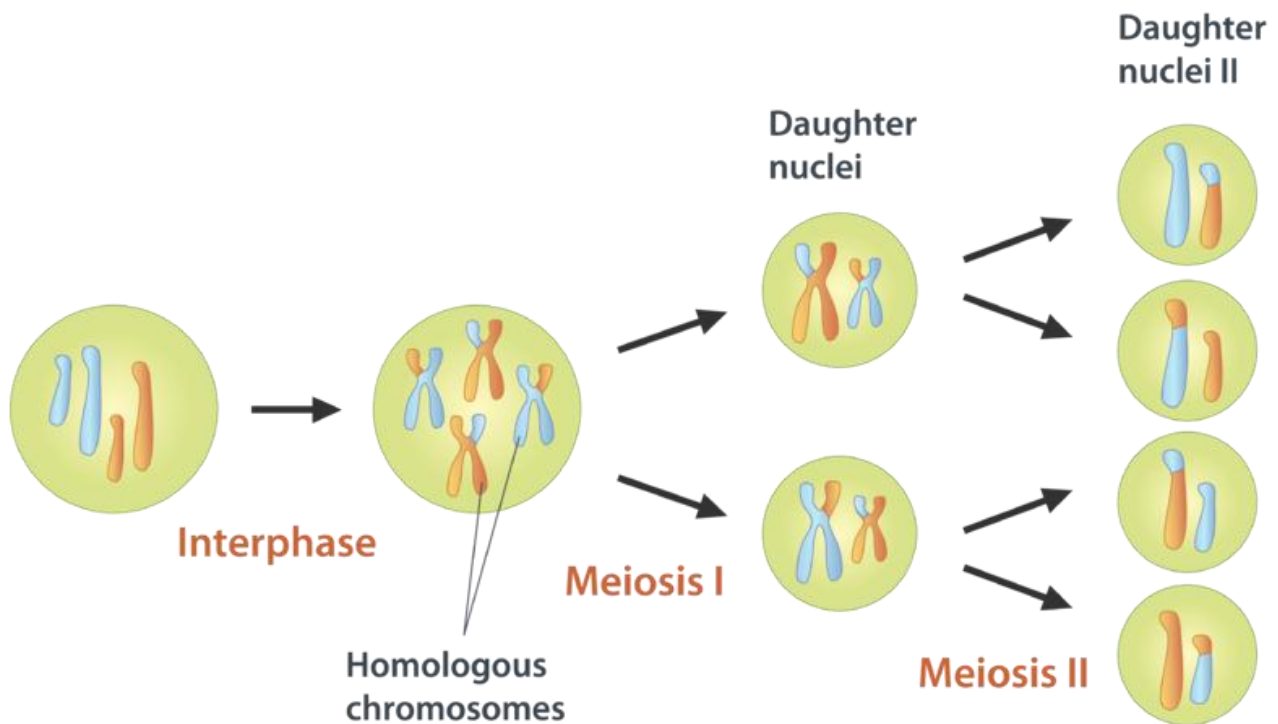
one set of chromosomes (n)

→ gametes (reproductive cells)



Meiosis

a type of cell division that produces gametes

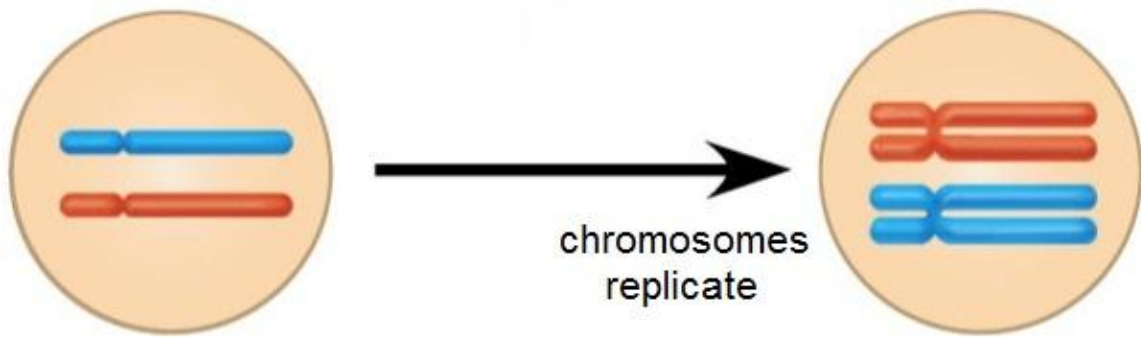


Results of meiosis

- reduces the number of chromosomes by half
- forms cells that allow each parent to contribute equal amounts of genetic information to the offspring
- important source of variation in offspring

Before meiosis

each chromosome pair doubles to form identical copies



Meiosis I

1. homologous chromosomes form pairs
2. chromosomes recombine (cross over)
3. chromosomes separate
4. two daughter cells form

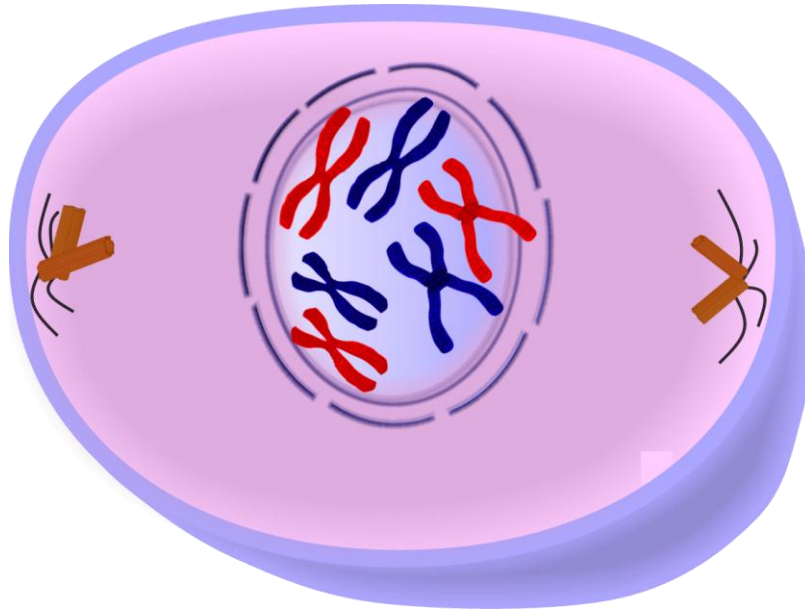
The phases are similar to mitosis

Chromosome pairs double to make two identical copies before meiosis begins

Prophase I

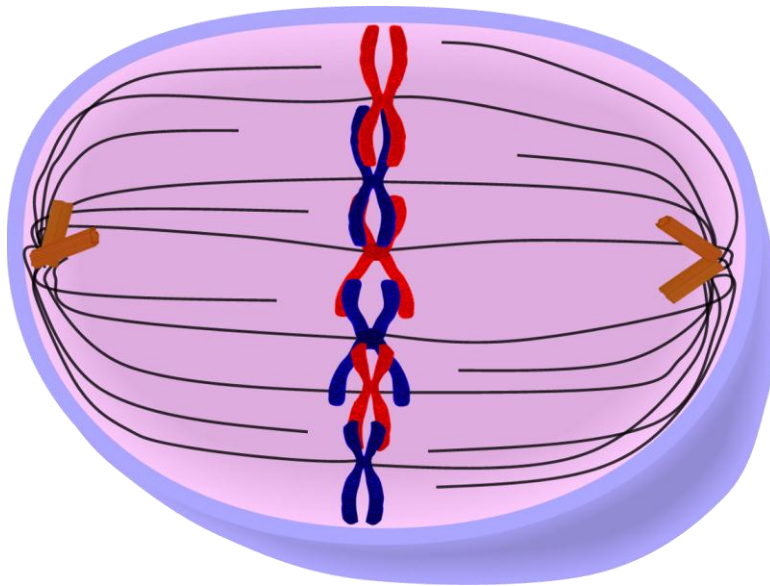
chromosomes thicken and recombine (cross over)

The nuclear membrane breaks down



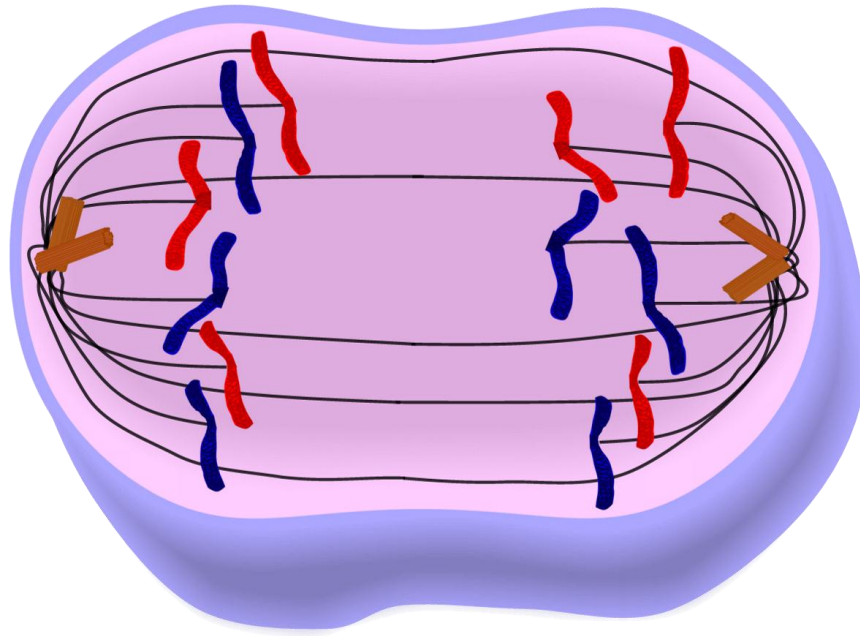
Metaphase I

chromosomes pair up and move to the middle of the cell



Anaphase I

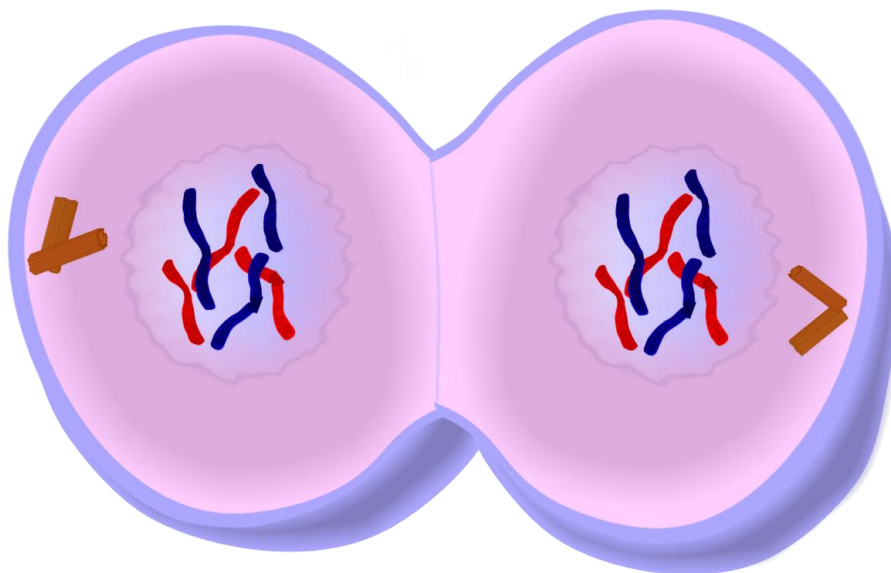
chromosomes separate and move toward opposite ends of the cell



Telophase I

the nuclear membrane reforms

The cell undergoes cytokinesis



http://www.phschool.com/science/biology_place/biocoach/meiosis/mei1ani.html

The two new cells contain half the number of chromosomes of the original cell

However, each new cell contains two copies (as chromatids)

Meiosis II

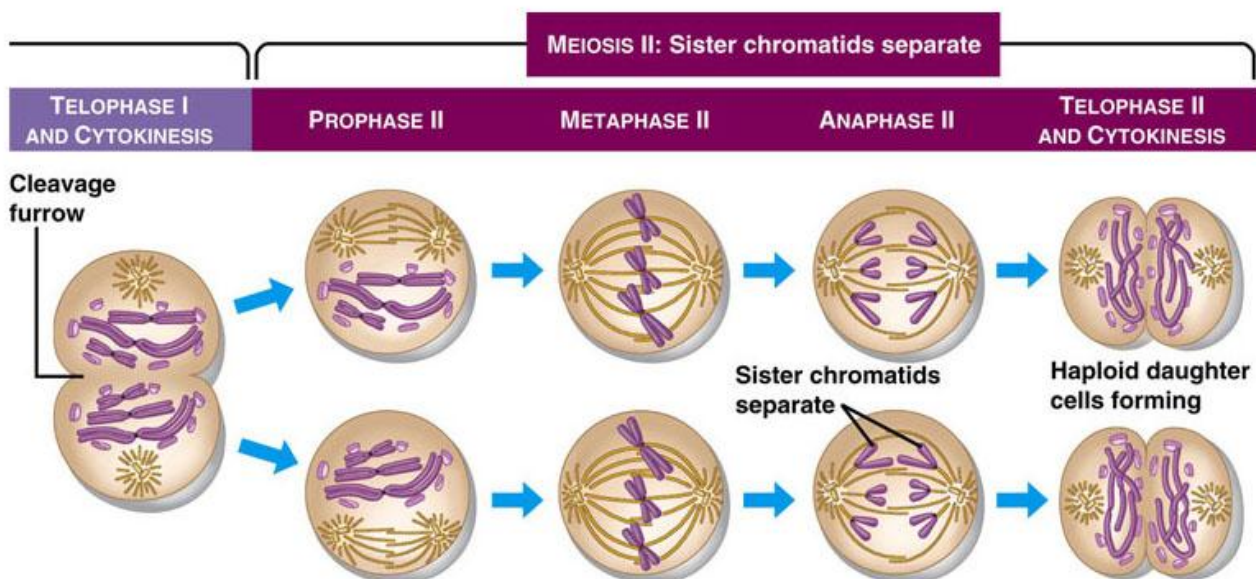
chromatids separate

1. Prophase II
2. Metaphase II
3. Anaphase II
4. Telophase II

Steps are similar to meiosis I

4 haploid daughter cells formed

They have half the number of chromosomes of the original cell



Mitosis

- Produces 2 diploid cells
- Creates all body cells except reproductive cells
- Cells are genetically identical
- Chromosome number stays the same

Meiosis

- Produces 4 haploid cells
- Creates sperm/egg cells
- Cells are genetically different
- Chromosome number reduced by half
- Crossing over of chromatids occurs (mixing of DNA)

http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter3/animation_stages_of_meiosis.html

<http://www.sinauer.com/cooper5e/animation1607.html>

<http://www.cellsalive.com/meiosis.htm>

http://www.phschool.com/science/biology_place/biocoach/meiosis/proii.html

http://www.phschool.com/science/biology_place/biocoach/meiosis/metaii.html

http://www.phschool.com/science/biology_place/biocoach/meiosis/anaii.html

http://www.phschool.com/science/biology_place/biocoach/meiosis/teloi.html

http://www.phschool.com/science/biology_place/biocoach/meiosis/mei2ani.html

http://www.biostudio.com/d_%20Meiosis.htm

A Cellular View of Inheritance

Process and Procedures

Part A: Meiosis

Date

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1. Write a paragraph that explains the relationship between the terms “gene,” “chromosome,” “DNA,” and “allele.”

2a. How many times is DNA copied, or synthesized, during meiosis?

2b. How many times are the chromosomes pulled to the poles of the cell?

2c. How many times does the cell divide?

2d. How does the number of chromosomes in the gametes compare with the number of chromosomes in the cell at the beginning of the process?

3. Fill in the boxes with a description of each stage of meiosis.

6a. How many chromosomes do human cells have before meiosis?

6b. How many pairs of chromosomes do human cells have?

6c. How many chromosomes do human cells have after meiosis?

6d. Explain why this is so.

6e. Describe the difference between haploid and diploid cells.